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<p>(21) International Application Number: PCT/GB94/01077 (22) International Filing Date: 19 May 1994 (19.05.94) (30) Priority Data: 9310313.3 19 May 1993 (19.05.93) GB (71) Applicant (for all designated States except US): GLE-NEAGLES SPRING WATERS COMPANY LIMITED [GB/GB]; The Maltings, Moray Street, Blackford, Perthshire PH4 1OF (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): HAMILTON, John, Stewart [GB/GB]; The Orchard, Kirkton of Mailer, Perth PH2 0ST (GB). (74) Agent: FRANK B. DEHN &amp; CO.; Imperial House, 15-19 Kingsway, London WC2B 6UZ (GB).</p>		<p>(81) Designated States: CA, GB, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  Published With international search report.</p>
<p>(54) Title: METHOD FOR THE STERILE PRESERVATION OF A LIQUID IN A CONTAINER</p> <p>(57) Abstract</p> <p>In order to prevent bacteria in a container (1) for storing liquid for human consumption, the container or bottle (1) incorporates internally a deposit (3) of a material which destroys micro-organisms.</p> <div data-bbox="868 1144 1347 1680"> </div>		

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METHOD FOR THE STERILE PRESERVATION  
OF A LIQUID IN A CONTAINER

5           This invention relates to containers for storing liquids and is particularly, but not exclusively, applicable to containers for storing liquid for human consumption.

10           The invention is concerned particularly with water containers or bottles such as are used in retailing still waters, including mineral waters.

          The term "bottle" in this context includes a closure therefor.

15           According to the present invention, there is provided a container or bottle incorporating internally a deposit of a material which destroys micro-organisms.

          Preferably, the said material is metallic silver or a silver salt.

20           Preferably, the said material is present in the pores of a porous ceramic element or within a fine ceramic structure.

          Preferably, the said material is present as a micro-thin layer on at least part of the inside surface of the container or bottle. For example the layer may  
25           be deposited in an annular band on the inside surface of the container.

          Preferably, in the case of a bottle, the said material is present on the inside of the bottle closure. This may have manufacturing advantages over forming the  
30           deposit in the body of the bottle. In one particularly preferred form the material is silver which is impregnated in a bead or pellet of finely porous ceramic which is disposed within a ring depending from the top of the bottle closure. The pellet is retained within  
35           the ring by bending the edge of the ring inwards on the application of heat thereto.

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Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings wherein:

Fig. 1 shows a bottle incorporating a deposit of bactericidal material in accordance with one embodiment of the invention;

Fig. 2 shows a bottle incorporating a deposit of a bactericidal material in accordance with another embodiment of the invention.

Fig. 3 shows the cap of a container according to a preferred embodiment of the invention.

In one example of a bottle 1 in accordance with the present invention, as shown in Fig. 1, a bead or pellet 3 of fine ceramic structure, which, when baked, has a porous structure, has finely divided metallic silver anchored within the fine structure or porosity. The bead or pellet may be made by mixing a ceramic paste with silver and baking it so that the silver is exposed throughout the porous structure. The bead or pellet 3 is fixed substantially centrally inside the bottle cap 2. The bead or pellet 3 may be deposited within an inner cage or ring 4 formed by a downwardly depending wall arranged concentrically within the sides of the cap 2. This is then sealed by heat treatment.

In a preferred embodiment, the impregnated pellet 3 is locked into a modified bottle cap as shown in Fig. 3. A substantially circular wall 4 is formed inside the cap 2, extending a short distance from the top 6 of the cap 2 and formed concentrically with, and inwardly of, the cap wall 7. The impregnated pellet 3 is then placed within this ring 4. The ring 4 is preferably made of a plastics material. The edge distal from the top of the cap is heated and bent inwards to fix the pellet 3 within the ring 4.

In another example of a bottle 1 in accordance with the present invention, as shown in Fig. 2, a micro-thin deposit of metallic silver forms an annular band 5 on

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part of the inside surface of the bottle 1.  
Alternatively, the deposit could be positioned at the  
base of the bottle as shown at 8.

In each example, the silver present acts in a  
bactericidal manner with the advantage that high purity  
5 of the product contained in the bottle 1 is preserved  
subsequent to opening. Tests have proved that a pellet  
3 inserted in a container 1 as described is effective  
against microbes.

It will be preferable to dispose the bottle 1 on  
10 its side in order to promote contact between the  
contents and the silver-bearing element or deposit.

Although in the preferred embodiment the container  
is used to store liquids for human consumption, e.g.  
spring water, it may also have other applications where  
15 it is necessary to store a pure liquid which must be  
kept free of bacteria, such as contact lens solution.

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Claims

1. A container for storing liquids, said container incorporating internally a deposit of a material which destroys micro-organisms.
- 5 2. The container of claim 1, wherein said material is metallic silver or a silver salt.
3. The container of claim 1 or 2 wherein said material  
10 is present in the pores of a porous ceramic element.
4. The container of claim 1 or 2 wherein said material is present within a fine ceramic structure.
- 15 5. The container of any preceding claim wherein said material is present as a micro-thin layer on at least part of the inside surface of said container.
6. The container of any preceding claim wherein said  
20 container is a bottle and said material is present on the inside of the bottle closure.
7. The container of claim 6 wherein said material is in the form of a bead or pellet.
- 25 8. The container of claim 7 wherein said pellet is disposed in a ring depending from the top of said bottle closure.
- 30 9. The container of claim 8 wherein said pellet is retained within said ring by applying heat to the edge of said ring.

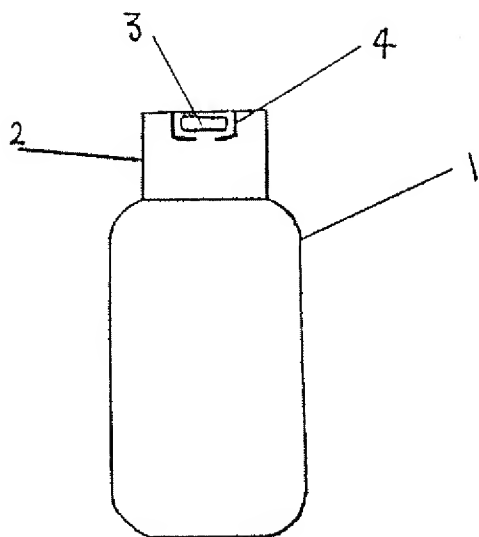


FIG 1

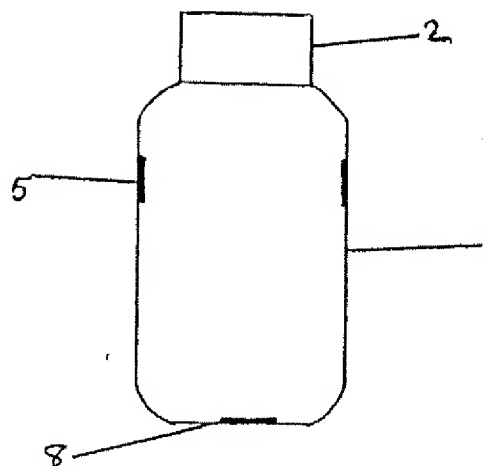


FIG 2

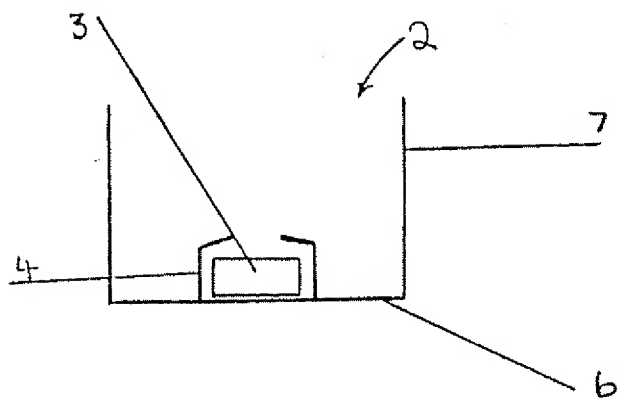


FIG 3

## INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/GB 94/01077

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 B65D81/28

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 5 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US,A,3 092 552 (ROMANS) 4 June 1963 see column 1, line 19 - line 41 ---	1,2,5 3,4,6
Y A	EP,A,0 322 171 (NISSHO) 28 June 1989 see column 1, line 40 - column 2, line 14 see column 3, line 1 - line 29 ---	3,4 7
Y A	GB,A,1 259 100 (GRANTS) 5 January 1972 see page 1, line 72 - line 83 see page 2, line 40 - line 87 ---	6 7-9
A	US,A,2 541 525 (LEWYT) 4 June 1949 see the whole document -----	8,9

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 94/01077

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3092552		NONE	
EP-A-0322171	28-06-89	JP-A- 1165337	29-06-89
GB-A-1259100	05-01-72	NONE	
US-A-2541525		NONE	